

Application Serial No. 10/603,050
Reply to Office Action of September 20, 2004

PATENT
Docket: CU-3269

Amendments To The Claims

The listing of claims presented below will replace all prior versions, and listings, of claims in the application.

Listing of claims:

1. (currently amended) A vertical alignment mode liquid crystal display device which comprises:

upper and lower substrates which are disposed opposite one another at the desired interval;

a liquid crystal layer sandwiched between the upper and lower substrates and formed of liquid crystals having negative dielectric anisotropy;

a resin layer which is applied on the inner surface of the lower substrate so as to cover a thin film transistor, the resin layer having a centipede-shaped protrusion formed on the surface thereof, wherein the protrusion has a middle section and a plurality of branch sections, every branch section extending from the middle section perpendicularly;

a pixel electrode which is formed on the protrusion while being disposed all over a pixel region;

a counter electrode which is formed on the inner surface of the upper substrate;

vertical alignment films which are interposed between the pixel electrode and the liquid crystal layer and between the counter electrode and the liquid crystal layer, respectively; and

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polarizers which are attached on the outer surfaces of the upper and lower substrate, respectively, in such a manner that their polarizing axes cross each other.

2. (original) The vertical alignment mode liquid crystal display device of claim 1, wherein the centipede-shaped protrusion consists of a central portion having a width of less than 5 μm , and outer portions which are arranged at both sides of the central portion at intervals of 4-25 μm .

3. (original) The vertical alignment mode liquid crystal display device of claim 1, wherein the pixel electrode is formed in such a manner that the interval between two adjacent pixel electrodes is less than 10 μm .

4. (currently amended) The A vertical alignment mode liquid crystal display device of claim 1, comprising:

upper and lower substrates which are disposed opposite one another at the desired interval;
a liquid crystal layer sandwiched between the upper and lower substrates and formed of liquid crystals having negative dielectric anisotropy;

a resin layer which is applied on the inner surface of the lower substrate so as to cover a thin film transistor, the resin layer having a centipede-shaped protrusion formed on the surface thereof wherein the laminated structure of the protrusion and the pixel electrode formed thereon is formed into a clamp shape within a unit pixel such that a multi-domain of liquid crystals can be formed;

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a pixel electrode which is formed on the protrusion while being disposed all over a pixel region;
a counter electrode which is formed on the inner surface of the upper substrate;
vertical alignment films which are interposed between the pixel electrode and the liquid crystal layer and between the counter electrode and the liquid crystal layer, respectively; and
polarizers which are attached on the outer surfaces of the upper and lower substrate, respectively, in such a manner that their polarizing axes cross each other.

5. (original) The vertical alignment mode liquid crystal display device of claim 1, which further comprises phase compensation plates interposed between the upper substrate and the adjacent polarizer and between the lower substrate and the adjacent polarizer.
6. (original) The vertical alignment mode liquid crystal display device of claim 5, wherein the phase compensation plates are monoaxial phase compensation plates or biaxial phase compensation plates, in which the monoaxial phase compensation plates have a phase delay value ranging from 40 to 800 nm, and the biaxial phase compensation plates have a phase delay value ranging from 150 to 250 nm.
7. (original) The vertical alignment mode liquid crystal display device of claim 1, wherein the liquid crystals have a dielectric anisotropy of -2 to -10.
8. (original) The vertical alignment mode liquid crystal display device of claim 1, wherein the liquid crystal layer has a thickness of 2-6 μ m, and the thickness of the liquid

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crystal layer times the refractive index anisotropy of the liquid crystals is 200-500 nm.

9. (new) The vertical alignment mode liquid crystal display device of claim 4, wherein the centipede-shaped protrusion consists of a central portion having a width of less than 5 μm , and outer portions which are arranged at both sides of the central portion at intervals of 4-25 μm .

10. (new) The vertical alignment mode liquid crystal display device of claim 4, wherein the pixel electrode is formed in such a manner that the interval between two adjacent pixel electrodes is less than 10 μm .

11. (new) The vertical alignment mode liquid crystal display device of claim 4, which further comprises phase compensation plates interposed between the upper substrate and the adjacent polarizer and between the lower substrate and the adjacent polarizer.

12. (new) The vertical alignment mode liquid crystal display device of claim 11, wherein the phase compensation plates are monoaxial phase compensation plates or biaxial phase compensation plates, in which the monoaxial phase compensation plates have a phase delay value ranging from 40 to 800 nm, and the biaxial phase compensation plates have a phase delay value ranging from 150 to 250 nm.

13. (new) The vertical alignment mode liquid crystal display device of claim 4, wherein the liquid crystals have a dielectric anisotropy of -2 to -10.

14. (new) The vertical alignment mode liquid crystal display device of claim 4, wherein the liquid crystal layer has a thickness of 2-6 μm , and the thickness of the liquid crystal layer times the refractive index anisotropy of the liquid crystals is 200-500 nm.